rTMS REDUCES DELTA AND INCREASES THETA OSCILLATIONS IN ALZHEIMER'S DISEASE: A VISUAL-EVOKED AND EVENT-RELATED POTENTIALS STUDY

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Abstract

Background: Repetitive transcranial magnetic stimulation (rTMS) has emerged as a promising alternative therapy for Alzheimer's disease (AD) due to its ability to modulate neural networks and enhance cognitive function. This treatment offers the unique advantage of enabling real-time monitoring of immediate cognitive effects and dynamic brain changes through electroencephalography (EEG). Objective: This study focused on exploring the effects of left parietal rTMS stimulation on visual evoked potentials (VEP) and visual event-related potentials (VERP) in AD patients. Methods: Sixteen AD patients were recruited for this longitudinal study. EEG data were collected within a Faraday cage both pre and post-rTMS to evaluate its impact on potentials. Results: Significant alterations were found in both VEP and VERP oscillations. Specifically, delta power in VEP decreased while theta power in VERP increased post-rTMS, indicating a modulation of brain activities. Discussion: These findings confirm the positive modulatory impact of rTMS on brain activities in AD, evidenced by improved cognitive scores. They align with previous studies highlighting the potential of rTMS in managing hyperexcitability and oscillatory disturbances in the AD cortex. Conclusion: Cognitive improvements post-rTMS endorse its potential as a promising neuromodulatory treatment for cognitive enhancement in AD, thereby providing critical insights into the neurophysiological anomalies in AD and possible therapeutic avenues.

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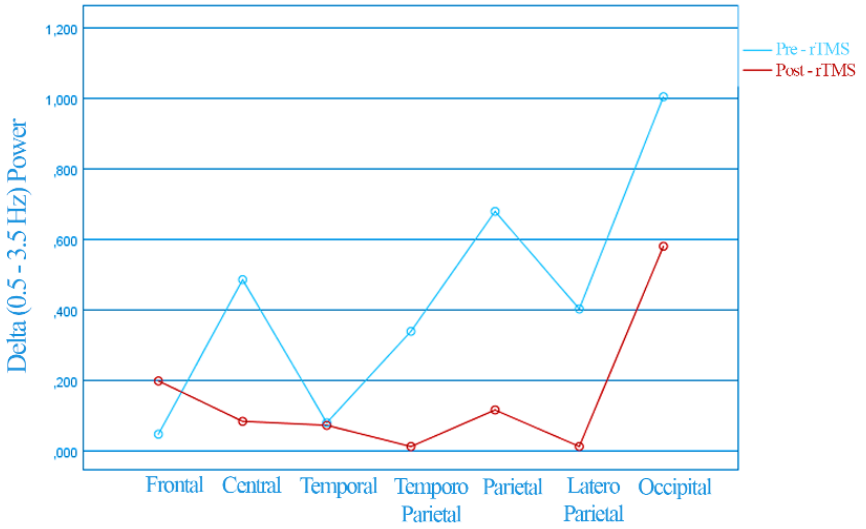
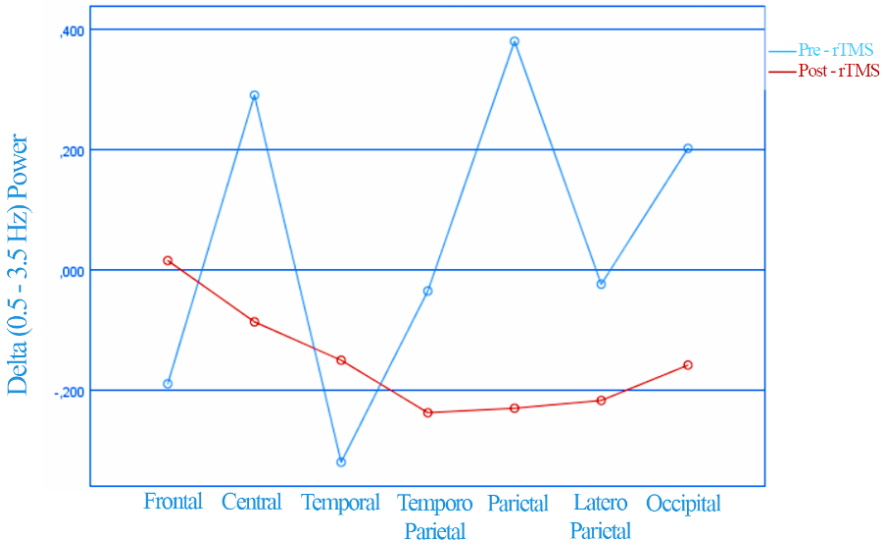
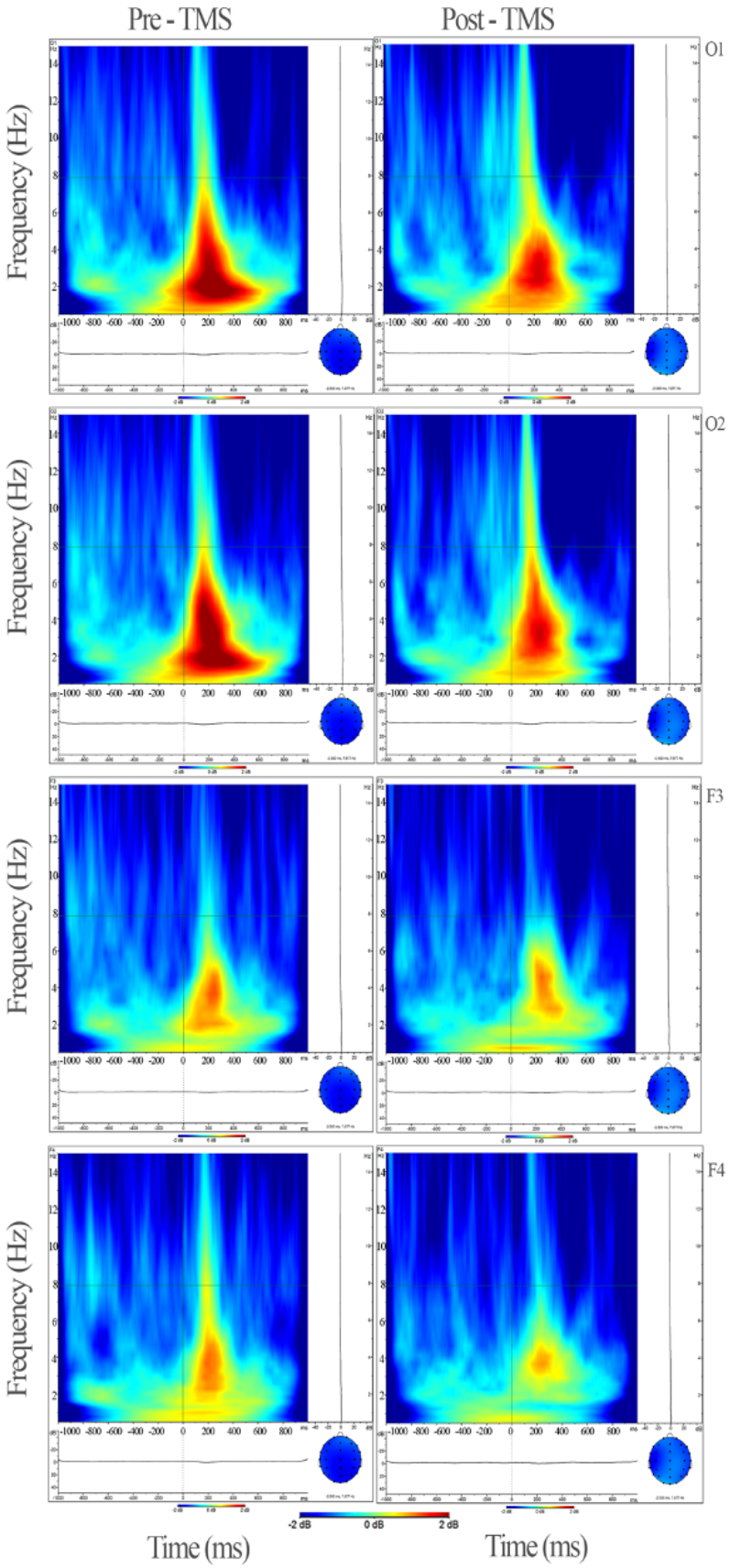
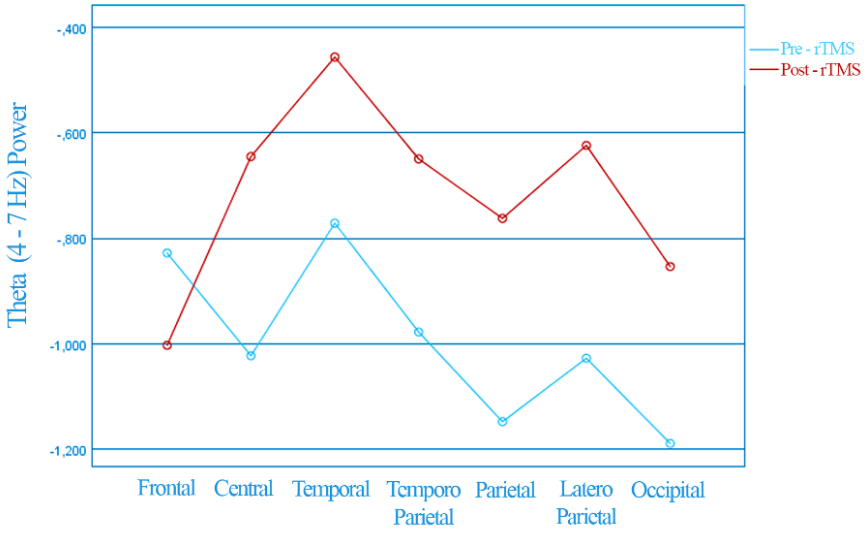
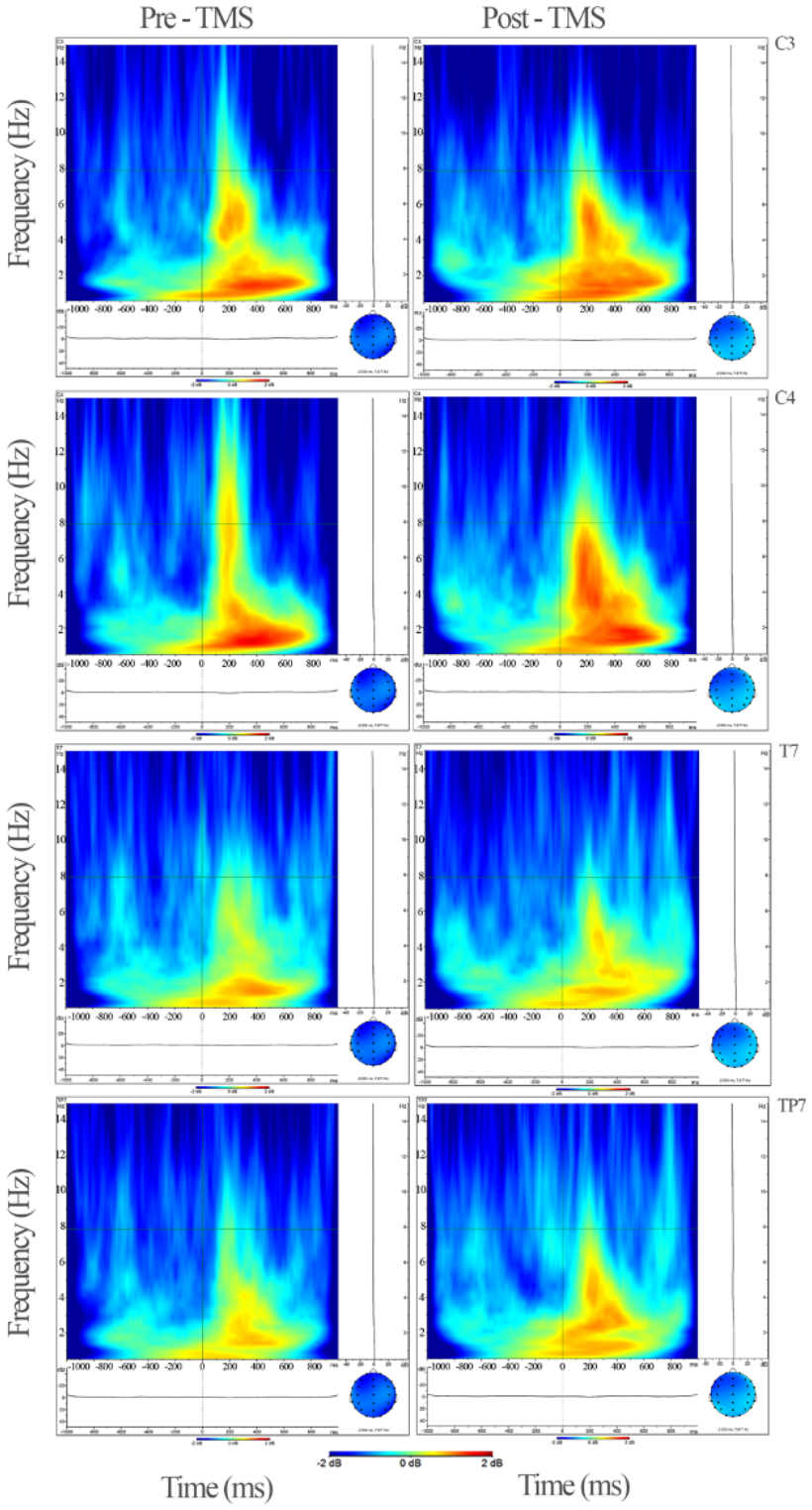
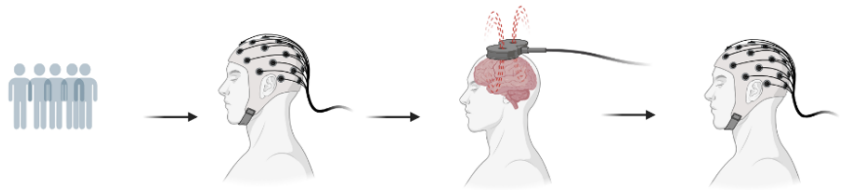










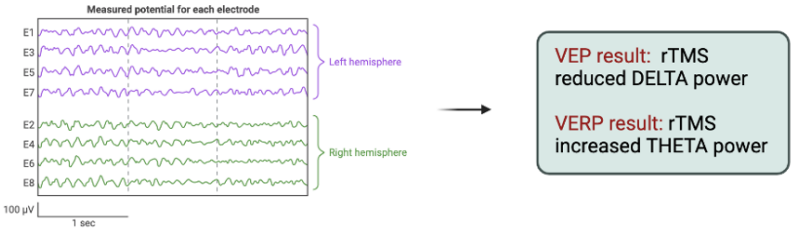


Sixteen AD patients recruited for the study

Before the rTMS application VEP and VERP EEG data collected

Ten sessions rTMS applied to the left lateral parietal cortex along 2 weeks

After 2 weeks from the rTMS application VEP and VERP EEG data collected again



VEP and VERP EEG data analysis